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FEATURE

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WORLD'S OLDEST PLANTS HOLD HOPE FOR THE FUTURE

by BOB STANLEY

Algae are probably the oldest form of plant life on our planet, and also the most versatile. Found in habitats from the arctic to the equator, they come in more than 25,000 varieties, vary in size from microscopic to massive, and are used in the manufacture of a bewildering array of products - from beer to dynamite.

Most people think of algae, if they think of it at all, as that slimy green stuff that forms on the surface of almost anything that is immersed in water, and makes walking on a rocky shore at low tide a hazardous pastime. In fact there are three main types of algae - green, red, and brown - and they form the basis of all aquatic life.

The tiniest green algae measure about 3 microns (a micron is one-millionth of a metre), while their giant cousins, the ocean-going seaweeds such as Sargasso weed, may be 60 metres or more in length. Not all algae live in the water: they can also be found on rocks, tree trunks, in the soil, even on the fur of South America's slow-moving tree sloth.

Seaweed algae have been used for centuries for animal feed, food, fertilizer, and other purposes. Today extracts such as agar and algin, taken from various red and brown algae, are used in making products as diverse as ice cream, glue, photographic film, plastics, polishes, paints, mineral waters, beer and wine, pharmaceuticals, and cosmetics. Basically gelling agents, they are also used in processes such as canning and preserving fish, finishing leather, and sizing fabrics. Fossilized algae found in certain types of rocks are used in the production of some drugs, fertilizers, and dynamite.

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In Hawaii about 40 types of seaweed algae are eaten regularly, and in Japan, production of seaweed for human consumption has been commercialized to the point of growing the stuff in factories using artifical sea water! Algae products like kobu are used in Japan for everything from sandwiches to soup.

In fact, seaweeds are of very little food value to humans because our digestive systems are unable to break down their complex structure and extract much of their protein. We can, however, benefit from their mineral, vitamin, and iodine content, and this may be why various medicinal properties are frequently claimed for certain types of seaweed.

The green microalgae, nevertheless, contain as much as 50 percent pure protein and under ideal conditions can produce up to 80 times as much protein per hectare in a year as soyabean. Not surprisingly, scientists are very interested in recovering some of that protein to feed a hungry world.

Experiments at India's Central Food Technological Research Institute (CFTRI) have led to the development of pilot-scale techniques for the production of algae-based protein supplements for both animal and human consumption.

Dr Wolfgang Becker, a German plant physiologist, has worked on the CFTRI project and one in Thailand also supported by the German government. He believes that the utilization of algae protein must be fully developed in the near future, and sees the need for both large-scale production plants and village-level technology to lower production costs once problems of reliability, nutritional safety, and acceptability have been overcome.

Microalgae have another important attribute : the ability to remove pollutants from water. Dr Joseph Dodd, a leading American researcher in the algae field, believes algae could be the solution to pollution problems in North America's Great Lakes. Instead of trying to destroy the algae in the lakes that are feeding on industrial effluent, he says, we should allow the algae to grow (and purify the water in the process) then harvest it and use it for animal feed and fertilizer.

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Dr Dodd is a consultant on a project in Singapore supported by Canada's International Development Research Centre (IDRC) that uses the same principle. Intensive pig farming in Singapore presents a costly waste disposal problem. Now, instead of disposing of piggery wastes, researchers are using them to produce algae in ponds similar to those used in India. The wastes are fermented first, however, to produce biogas, which can later be used as fuel to dry the daily algae harvest.

The project is part of a broad-based program for animal wastes management and utilization supported by the United Nations Development Programme and the Food and Agriculture Organization (UNDP/FAO). Project leader Dr Lee Boon Yang says the results so far are encouraging - algae protein can replace 50 percent of the soyabean meal in pig diets with no adverse reactions, and various techniques are still being developed to improve digestibility of algae feeds.

"There is no doubt", says Dr Lee, "that the recovery of algal protein from organic wastes can have a positive impact on the world food situation."

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